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EXAMINER

BEISNER, WILLIAM H

ART UNIT PAPER NUMBER

1744

DATE MAILED: 03/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/751,657

Applicant(s)

ANDERSON ET AL.

Examiner

William H. Beisner

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10/6/03; 11/24/03 and 1/15/04.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 45-49 and 66-110 is/are pending in the application.
- 4a) Of the above claim(s) 49 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 45-49 and 66-110 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Claim 49 stands withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim.

Applicant timely traversed the restriction (election) requirement in Paper No. 11.

2. Applicant's election with traverse of Group II, Claims 45-48, in Paper No. 11 and in the responses dated 06 Oct. 2003; 24 Nov. 2003 and 15 Jan. 2004 is acknowledged. The traversal is on the ground(s) that all the claims could be searched and examined at the same time. This is not found persuasive because as required of 35 USC 121, the Examiner has shown that the groups of claims are distinct and/or independent inventions for the reasons set forth in the office action dated 04 Dec. 2002. Furthermore the Examiner has shown that search and examination of all of the claims poses a serious burden to the Examiner in view of the separate classification and/or different fields of search required of the different groups of inventions.

The requirement is still deemed proper and is therefore made FINAL.

Information Disclosure Statement

3. The information disclosure statement filed 06 Oct. 2003 has been considered and made of record.

Claim Rejections - 35 USC § 112

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4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 66-110 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 66-110 are newly recited claim limitations that recite additional structural elements in combination with the hybridization device of originally filed claims 45-48. Claims 45-48 correspond to the disclosed embodiment of "low volume hybridization system" and can be found in the lengthy specification beginning at column 51, line 38 and continues through column 52, line 45. Figures 41 and 42 correspond to this specific disclosure of "A low-volume hybridization device". New claims 66-110 recite additional features such as heaters, coolers, extraction chambers, base units, processing chambers, etc. See especially claims 74 and 99. Review of the disclosure encompassed by the text bridging column 51, line 38 through column 52, line 45 does not disclose the combination of the device of original claims 45-48 with the additional structures recited in claims 66-110. While the instant disclosure may individually disclose these elements used in other embodiments and/or combinations, the originally filed disclosure fails to convey, with reasonable clarity to those skilled in the art that, as of the filing date sought, applicants were in possession of the invention as now encompassed by claims 66-110. See *Ex parte Ohshiro*, 14 USPQ2d 1750. Further note in Applicants' response dated 06

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Oct. 2003, with respect to claims 66-110, Applicants merely state "Applicants have introduced new claims 66-110 fully supported by the pending specification". Applicants' response fails to refer to any specific page, line or Figure of the originally filed disclosure that would convey to one of ordinary skill in the art that Applicants were in the possession of the claimed invention encompassed by claims 66-110.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 74 and 99 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 74 recites that the "flexible diaphragm" of the reaction chamber of claim 45 is "constructed and arranged to compress said deformable plug for removing trapped liquids". The instant claims recite that the "deformable plug" is positioned within "an extraction chamber" that is distinct from the reaction chamber of claim 45. How can the diaphragm of the reaction chamber also be a structural element of the extraction chamber? Clarification and/or correction is requested.

The same holds true for the limitations recited in claim 99.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 45-48, 71, 78-96 and 102-110 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andreovski et al.(US 5,882,903) in view of Southgate et al.(US 5,863,502).

The reference of Andreovski et al. discloses a low-volume hybridization chamber device (110) that includes a base (111); a reaction chamber (250, 140) disposed in the base and bound by a flexible diaphragm (241,242).

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While the reference of Andrevski et al. discloses that hybridization reactions can be performed within the reaction chamber (250) (See column 19, lines 4-29), the reference is silent as to the use of a probe array in the reaction chamber.

The reference of Southgate et al. discloses that the use of a plurality of hybridization probes on a membrane (probe array) within a chamber of a microchannel device is known in the art (See column 24, line 66, to column 25, line 13).

In view of this teaching, it would have been obvious to one of ordinary skill in the art to employ a hybridization probe array membrane in the chamber of the reference of Andrevski et al. for the known and expected result of providing an alternative means recognized in the art to detect nucleic acids. The use of a probe array allows multiple types of nucleic acids to be detected in a single reaction chamber.

With respect to the claimed chamber volumes of claims 46 and 47, the reference of Andrevski et al. discloses 5 micro liters and 20 micro liters as possible chamber volumes (See column 9, lines 58-63).

With respect to the claimed pneumatic system for moving the diaphragm of claim 48, see the pneumatic system disclosed in Figs. 4A-4C which discloses moving the membranes (See column 5, lines 30-55).

With respect to the heating and cooling elements of claims 66-70, the reference of Andrevski et al. discloses the use of thermoelectric system (500A)(See column 6, lines 30-60; and column 14, lines 36-51).

With respect to claims 71, 78-96 and 102-110, the reference of Southgate et al. discloses that it is known in the art to provide a hybridization device in communication with other

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processing chambers including extraction chambers and/or amplification chambers (See Example 2). The reference also discloses the use of a base unit in combination with the cassette device that includes the auxiliary equipment required for control of the processing steps performed within the cassette device housing the reaction/processing chambers (See Figure 10 and column 18, line 55 to column 23, line 27).

In view of this teaching, it would have been obvious to one of ordinary skill in the art to employ the hybridization chamber of the modified primary reference with additional processing chambers including nucleic acid extraction and/or amplification chambers for the known and expected result of processing the sample using means known in the art for processing a liquid sample prior to detection using nucleic acid hybridization.

While the reference of Southgate et al. discloses the use of separation beads and wash liquids, in the absence of a showing of criticality and/or unexpected results, it would have been obvious to one of ordinary skill in the art to determine the optimum manner in which to extract the nucleic acid sample and means for manufacture while maintaining the required purification and detection efficiencies.

Note the above references are applicable as prior art under 35 USC 102(e) since the instant claims only have benefit of the filing date of parent application US 09/005,985 filed 12 January 1998 and/or provisional application US 60/043,490 filed 10 April 1997. The disclosures of the earlier applications do not provide support for the instant claim language.

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12. Claims 72, 73, 75-77, 79, 97, 98, 100, 101 and 103 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andreovski et al.(US 5,882,903) in view of Southgate et al.(US 5,863,502) taken further in view of Wainwright et al.(US 5,876,918).

The combination of the references of Andreovski et al. and Southgate et al. has been discussed above.

The above claims differ by reciting that the extraction chamber includes a porous and/or compressible plug material.

The reference of Wainwright et al. discloses that the use of a plug structure to extract nucleic acids from a liquid sample is known in the art.

In view of this teaching, it would have been obvious to one of ordinary skill in the art to position a plug structure in the extraction zone of the primary for the known and expected result of providing an alternative means recognized in the art for achieving the same result, separation of an analyte from a liquid sample. Note, the reference of Wainwright et al. discloses that the use of a plug provides advantages over beads because of an increased surface area to volume ratio.

While the reference discloses the use of specific polymer materials, it would have been obvious to one of ordinary skill in the art to employ other porous or fibrous plug structures known in the art for binding nucleic acids, such as glass wool, for the known and expected advantage associated with the use of a plug material over the use of beads.

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13. Claims 78, 80-86, 102 and 104-110 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andreovski et al.(US 5,882,903) in view of Southgate et al.(US 5,863,502) taken further in view of Schnipelsky et al.(US 5,229,297).

The combination of the references of Andreovski et al. and Southgate et al. has been discussed above.

The above claims differ by reciting that the extraction chamber includes a textured surface and/or beads for binding nucleic acids.

The reference of Schnipelsky et al. discloses that it is known in the art to separate or isolate nucleic acids from a liquid sample using immobilized beads on a surface or using a packed column of beads (See column 12, line 36 to column 13, line 17).

In view of this teaching, it would have been obvious to one of ordinary skill in the art to immobilize the beads in the microchamber of the primary reference in a manner as suggested by the reference of Schnipelsky et al. for the known and expected result of providing an alternative means recognized in the art to achieve the same result, providing a nucleic acid extraction surface in a microchamber device.

With respect to the composition of the beads, it would have been obvious to one of ordinary skill in the art to determine the optimum bead material from those known in the art for use in isolation of nucleic acids, including glass or porous glass or cellulose.

Double Patenting

14. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed.

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Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

15. Claims 74 and 99 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 and 2 of U.S. Patent No. 6,168,948 in view of Andreovski et al.(US 5,882,903) and Southgate et al.(US 5,863,502).

Claims 1 and 2 of U.S. Patent No. 6,168,948 encompass an extraction device that includes a flexible diaphragm for compressing a deformable plug positioned within the device.

The above claims differ by reciting that the extraction chamber is provided in combination with a nucleic acid hybridization chamber with a flexible diaphragm.

The reference of Andreovski et al. discloses that it is known in the art to perform nucleic acid hybridization within a chamber bound by a flexible diaphragm. The reference of Andreovski et al. discloses a low-volume hybridization chamber device (110) that includes a base (111); a reaction chamber (250, 140) disposed in the base and bound by a flexible diaphragm (241,242).

While the reference of Andreovski et al. discloses that hybridization reactions can be performed within the reaction chamber (250) (See column 19, lines 4-29), the reference is silent as to the use of a probe array in the reaction chamber.

The reference of Southgate et al. discloses that the use of a plurality of hybridization probes on a membrane (probe array) within a chamber of a microchannel device is known in the art (See column 24, line 66, to column 25, line 13).

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In view of this teaching, it would have been obvious to one of ordinary skill in the art to employ a hybridization probe array membrane in the chamber of the reference of Andreovski et al. for the known and expected result of providing an alternative means recognized in the art to detect nucleic acids. The use of a probe array allows multiple types of nucleic acids to be detected in a single reaction chamber.

With respect to the combination of the hybridization chamber suggested by the references of Andreovski et al. and Southgate et al. with the extraction chamber of claims 1 and 2 of U.S. patent No. 6,168,948, the reference of Southgate et al. discloses that it is known in the art to provide a hybridization device in communication with other processing chambers including extraction chambers and/or amplification chambers (See Example 2).

In view of this teaching, it would have been obvious to one of ordinary skill in the art to employ the hybridization chamber of the modified primary reference with additional processing chambers including nucleic acid extraction and/or amplification chambers for the known and expected result of processing the sample using means known in the art for processing a liquid sample prior to detection using nucleic acid hybridization.

Note while originally filed claims 45-48 were restricted from the claims of U.S. Patent 6,168,948, Applicants' addition of new claims 74 and 99 crosses the line on demarcation set forth in the restriction requirement with respect to the parent application corresponding to U.S. Patent 6,168,948.

Response to Arguments

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16. Applicant's arguments filed 06 Oct. 2003 have been fully considered but they are not persuasive.

With respect to the rejection of the claims in view of the combination of the references of Andreovski et al. and Southgate et al. under 35 USC 103, Applicants argue that the rejection is improper because the references are not prior art against the claims.

Applicants stress that while the references of Andreovski et al. and Southgate et al. have filing dates of 01 Nov. 1996 and 23 Jan. 1997, respectively, the instant claims have benefit of filing date of application 08/589,027, filed 19 Jan. 1996 (published as U.S. Patent No. 5,856,174). Applicants state that U.S. Application 08/589,027 discloses "a low-volume hybridization device having a base, a reaction chamber disposed in the base, wherein the reaction chamber is bound by a flexible diaphragm". Applicants also state that U.S. Application 08/589,027 "discloses a probe array (see, e.g., array 708) disposed in the reaction chamber". Applicants refer to Figures 2B, 5A, 5B and 7A to support their position.

In response, it is not clear to the Examiner how claim 45 is supported by the disclosure of U.S. Application 08/589,027 for the following reasons:

i) The disclosure of U.S. Application 08/589,027 is devoid of the language "low-volume hybridization device". The disclosure of U.S. Patent No. 6,168,948, filed 12 Jan. 1998, which corresponds to the disclosure of the instant application, employs the language "low-volume hybridization system" (See column 51, line 51). This disclosure conveys to one of ordinary skill in the art that a "low-volume hybridization system" would have a volume below 250ul (See column 51, lines 38-55). Applicants' comments are devoid of any reference to "low-volume

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hybridization system” in the disclosure of U.S. Application 08/589,027 or any reference to similar disclosure as that discussed above with respect to U.S. Patent No. 6,168,948.

ii) While Figure 7A of U.S. Application 08/589,027 discloses a probe array (708) used in combination with a reaction chamber (706), the disclosure of Figure 7A does not mention that the reaction chamber is “bound by a flexible diaphragm” nor does the disclosure define the device as a “low-volume hybridization device” as defined in the instant disclosure.

iii) While Figures 5A and 5B depict “chambers” with “flexible diaphragms” (valves), the disclosure corresponding to these figures is silent as to the use of a probe array in any of the chambers with the “flexible diaphragms. Actually, the disclosure related to these Figures suggests positioning a probe array in chamber (514 of Figure 5A) which is not even associated with a flexible diaphragm. Furthermore the disclosure associated with these figures does not identify the device as a “low-volume hybridization device” as defined in the instant disclosure.

iv) While Figure 2B depicts a “chamber” with a “flexible diaphragm” (valve), the disclosure corresponding to this figure is silent as to the use of a probe array in this chamber. Actually the disclosure identifies that chambers of Figure 2B as corresponding to chambers (504,510,512) of Figure 5A. Furthermore the disclosure associated with this figure does not identify the device as a “low-volume hybridization device” as defined in the instant disclosure.

v) While the individual components of the instantly claimed combination may be present in the disclosure of U.S. Application 08/589,027, Applicants have failed to show how *the claimed combination of elements* of instant claim 45 are supported in the disclosure of U.S. Application 08/589,027 as required of 35 USC 112, first paragraph.

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vi) Finally, Applicants' comments are silent as to how the disclosure of U.S. Application 08/589,027 supports the claim limitations of original claims 46-48 and newly recited claims 66-100 which recited the "low-volume hybridization device" in combination with additional structural elements. To be entitled to benefit of the filing date of U.S. Application 08/589,027, Applicants are required to establish that they were in the possession of the claimed invention at the time of the filing of U.S. Application 08/589,027.

Conclusion

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to William H. Beisner whose telephone number is 571-272-1269. The examiner can normally be reached on Tues. to Fri. and alt. Mon. from 6:15am to 3:45pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert J. Warden can be reached on 571-272-1281. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


William H. Beisner
Primary Examiner
Art Unit 1744

WHB